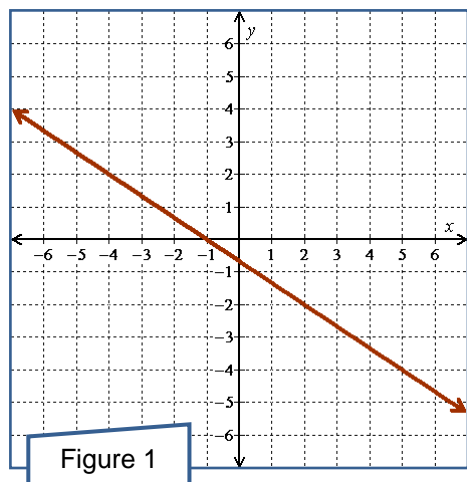
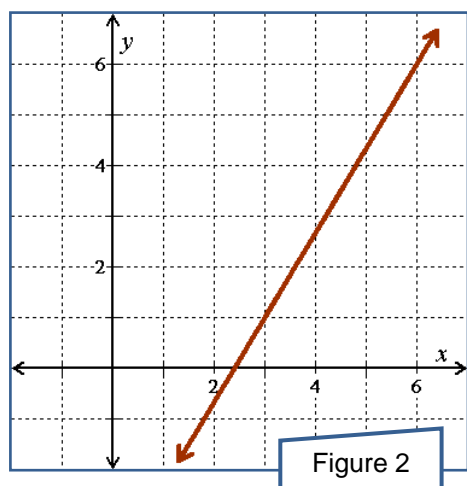


Example 1

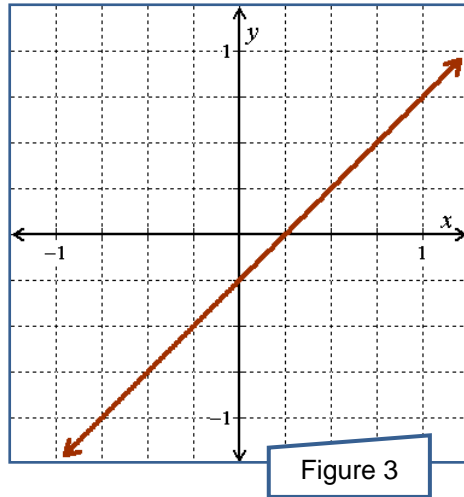
For each of figures 1-4 state the scale on each axis and use the concept of rise over run to find the slope of each line.



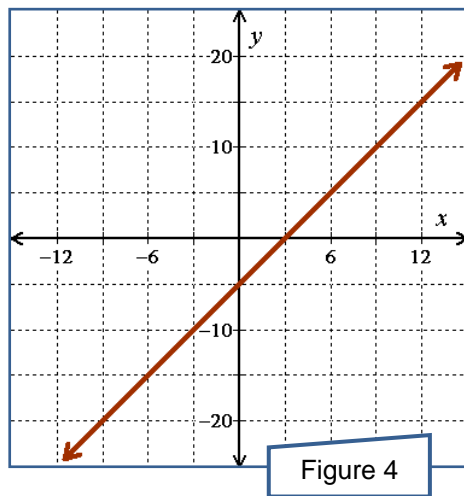
x -scale	y -scale	slope



x -scale	y -scale	slope



x -scale	y -scale	slope



x -scale	y -scale	slope

Definition

The **slope** of the line connecting the point (x_1, y_1) and (x_2, y_2) where $y_1 \neq y_2$ is $m = \frac{y_2 - y_1}{x_2 - x_1}$.

Slope is commonly referred to as “rise over run” where a positive rise means you go up, a negative rise means you go down, a positive run means you go right, and a negative run means you go left.

Example 2

Find the slope of the line connecting the points $(6, -3)$ and $(-4, 2)$.

Option A

$$x_1 = 6 \quad y_1 = -3$$

$$x_2 = -4 \quad y_2 = 2$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Option B

$$x_1 = -4 \quad y_1 = 2$$

$$x_2 = 6 \quad y_2 = -3$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

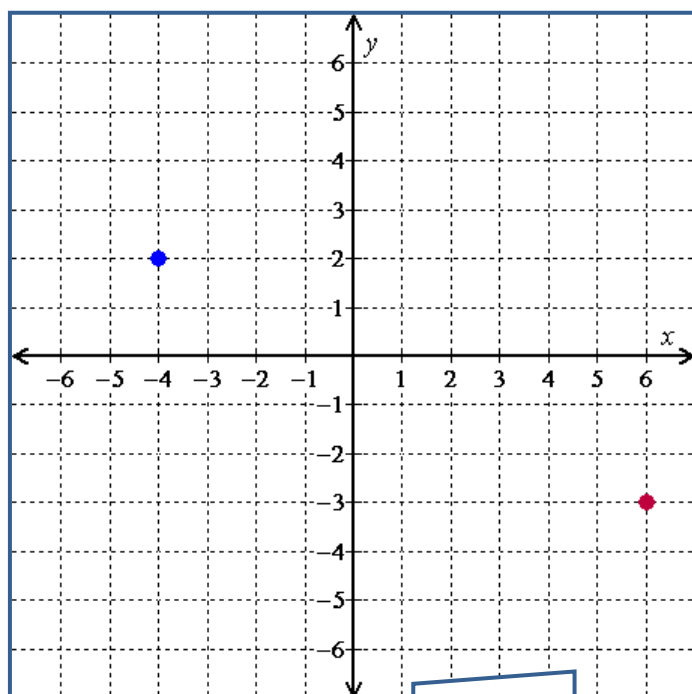


Figure 5

Example 3

Find the slope of the line connecting the points $(12, -5)$ and $(-6, 10)$.

Option A

$$x_1 = 12 \qquad y_1 = -5$$

$$x_2 = -6 \qquad y_2 = 10$$

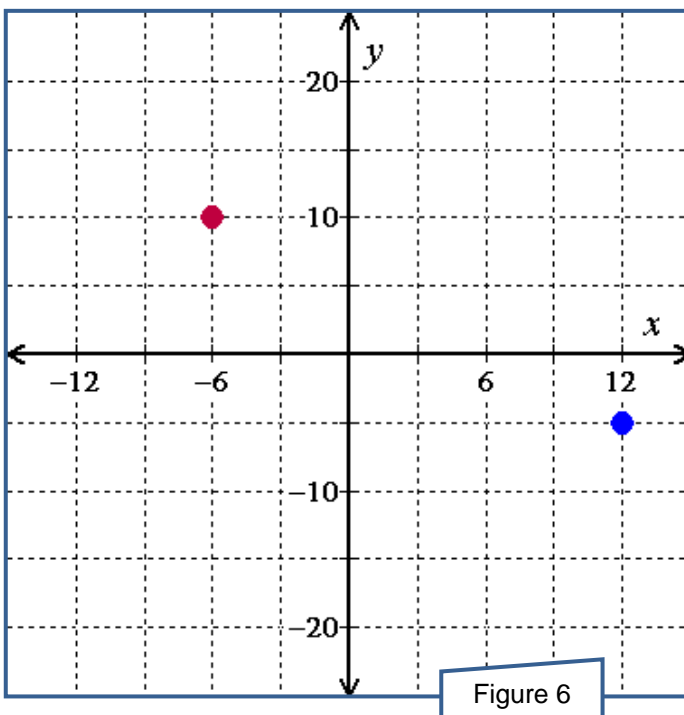
$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Option B

$$x_1 = -6 \qquad y_1 = 10$$

$$x_2 = 12 \qquad y_2 = -5$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$



Example 5

Find 2 points on the line $y = \frac{2}{7}x + 4$ and use those points to determine the slope of the line.

y_2			y_1
x_2			x_1

Example 6

Find 2 points on the line $y = -9x + 7$ and use those points to determine the slope of the line.

y_2			y_1
x_2			x_1

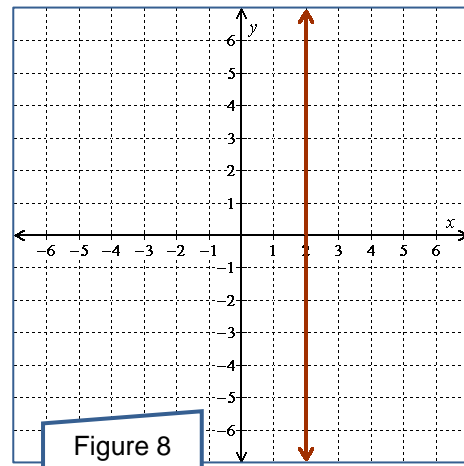
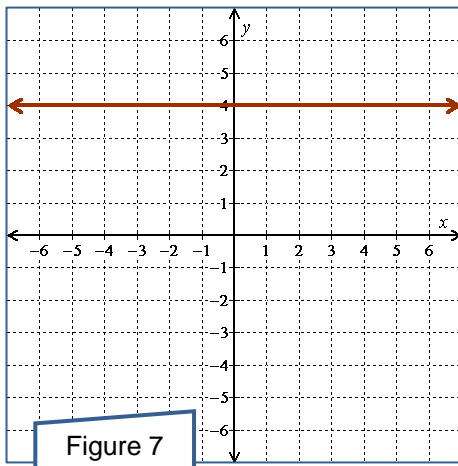
Example 7

Find 2 points on the line $x = -2y + 7$ and use those points to determine the slope of the line.

y_2			y_1
x_2			x_1

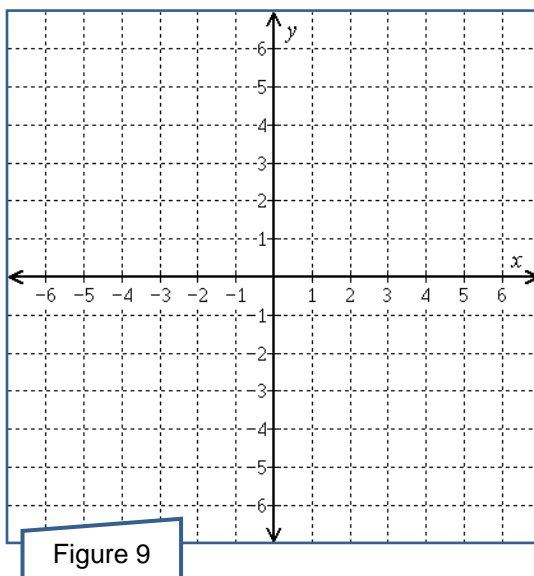
Example 8

Find the slope of the lines in figures 7 and 8.



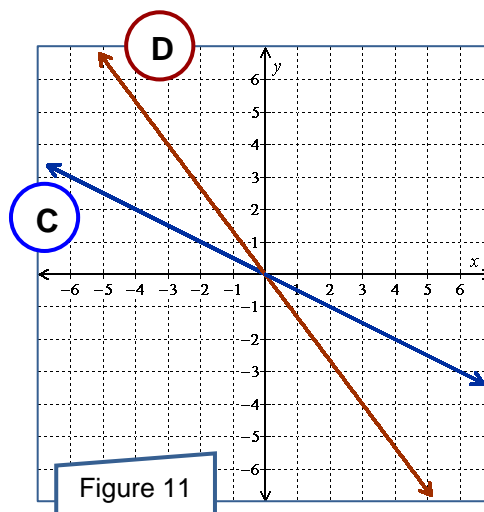
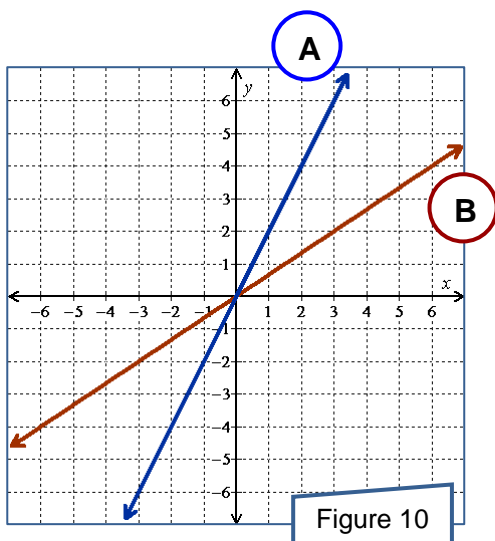
Example 9

Draw two lines onto Figure 9. One line should pass through the point $(0, -4)$ and the other should pass through the point $(0, 2)$. Both lines should have a slope of -2 . What else do the two lines have in common?



Example 10

Find the slope of each of the lines in figures 10 and 11. In each case, state which of the two lines has the greater slope.



True or False: The steeper the line the greater the slope.

True or False: The steeper the line the greater the absolute value of the slope.

Example 11

One of the lines in Figure 12 has a slope of 5, one has a slope of $\frac{5}{4}$, one has a slope of $\frac{4}{5}$, one has a slope of -1 , and one has a slope of $-\frac{2}{3}$. decide which line is which. Please note that scales and a grid have deliberately been omitted - the purpose of this problem is for you to **compare** the slopes of the lines, **not calculate** the slopes of the lines

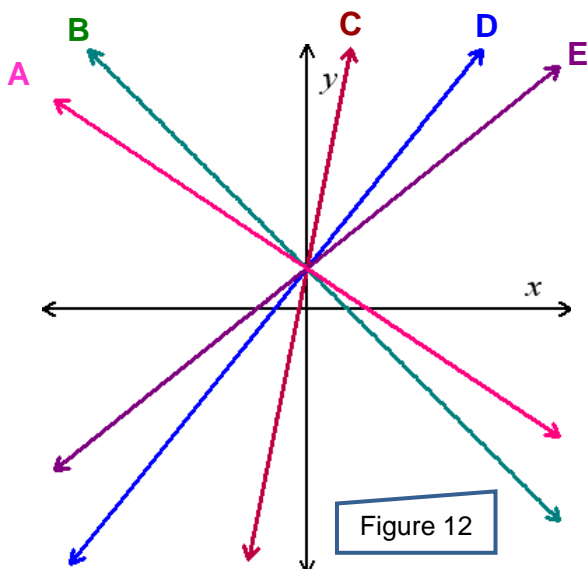
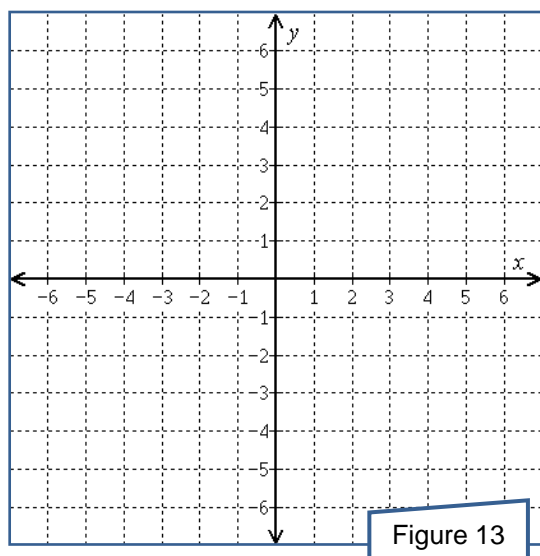


Table R

Slope	Line
5	
$\frac{5}{4}$	
$\frac{4}{5}$	
-1	
$-\frac{2}{3}$	

Example 12

Graph onto Figure 13 the lines with equations $y = \frac{3}{2}x - 4$ and $y = -\frac{2}{3}x + 1$. What do you observe about the lines? What is the slope of each line? How are the slopes arithmetically related?



Facts Jacks

Two non-vertical lines are parallel if and only if they have equal slope.

If neither line is vertical, two lines are perpendicular if and only if they have opposite reciprocal slopes.

Example 13

Determine if each given pair of lines is parallel, perpendicular, or neither.

Pair 1: ℓ_1 is the line through the points $(9,7)$ and $(-2,29)$.

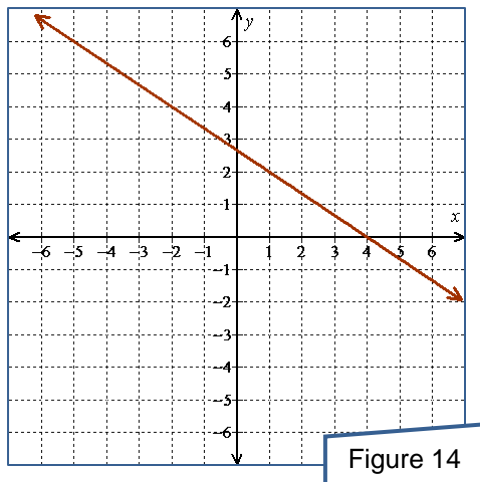
ℓ_2 is the line through the points $(-1,10)$ and $(-3,14)$.

Pair 2: ℓ_3 is the line through the points $(-9,1)$ and $(6,-4)$.

ℓ_4 is the line through the points $(2,5)$ and $(3,2)$.

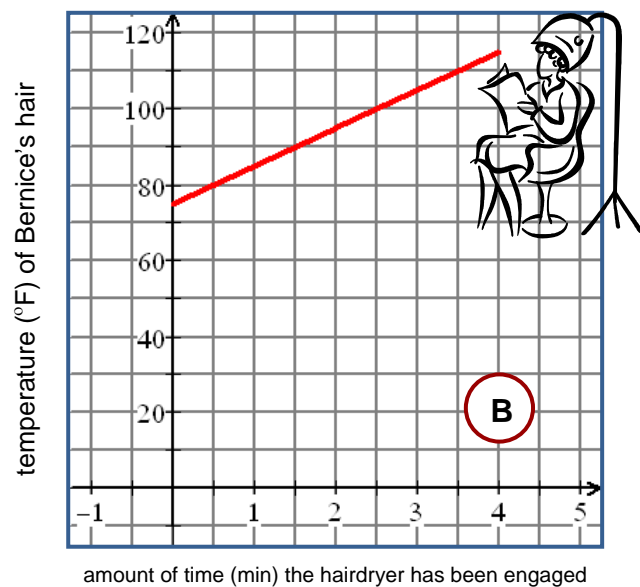
Example 15

Use algebra to determine the value of y that will make the line through the points $(1, y)$ and $(-3, -5)$ perpendicular to the line in Figure 14. Graph the line to verify your answer.



Example 15

Bernice needed to touch up her greys. Bernice's stylist Bernard convinced her to try life as a blond for a month. The bleach Bernard used required Bernice to sit under the hairdryer for several minutes. The graph in Figure B shows the temperature (degrees Fahrenheit) of Bernice's hair for the first 4 minutes after the dryer was turned on. Find the slope of the line segment - including unit - and interpret the slope as a rate of change.



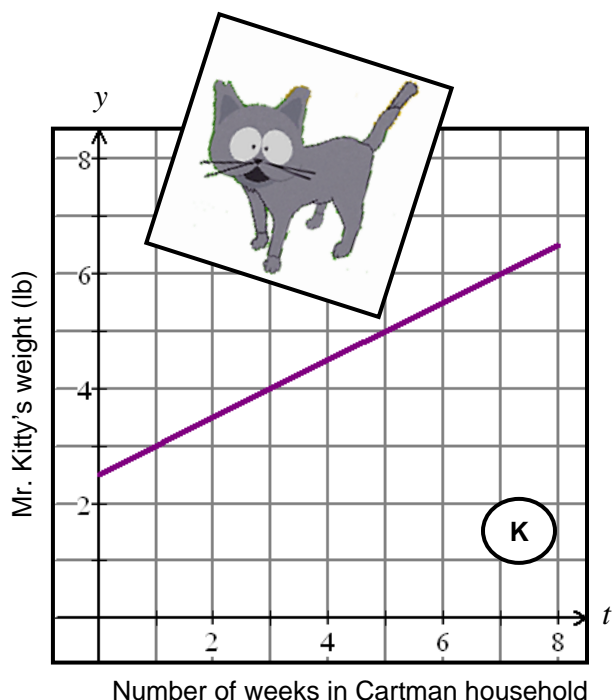
**Example 16**

Figure K shows a graph of Mr. Kitty's weight (lb) t weeks after the Cartmans brought him home. Calculate the slope of the line segment - *including unit* - and interpret the slope as a rate of change.

Example 17

Suppose that you have a line where the y -coordinates are the speed (ft/s) at which a roly-polly is travelling and the x -coordinates are the number of seconds that have passed since T-Bone flung the roly-polly into the air. After 1 second the bug is travelling at 49 ft/s and after 2 seconds it's travelling at 33 ft/s. Find the slope of the line (including unit!) and interpret the slope as a rate of change.

Example 18

The rate at which the Murphy's bed leaks depends upon the total weight of the people lying upon it. This relationship is linear over the interval shown in Table 1. Find the slope of this line (including unit!).

Table 1: Analysis of the leak in the Murphy's water bed

Total weight on water bed (lb)	Rate at which water leaks (pints/hr)
250	0.5
300	1.2
350	1.9
400	2.6